The State of Intelligent Transportation Systems in the National Park System

by
Eric Plosky, Cynthia Maloney, and Gary Ritter

I. Introduction

This paper was written to provide basic information in advance of the "National Workshop to Develop an Intelligent Transportation Systems Program Strategy for the National Park Service," June 19-20, 2001, to be held at the Central Federal Lands Highway Division Office in Lakewood, Colorado. In the spirit of promoting robust workshop discussion, the paper seeks to:

1) Acquaint National Park Service (NPS) staff with Intelligent Transportation Systems (ITS) and ITS applications, and

2) Acquaint transportation community participants with NPS transportation-related issues and concerns that might be amenable to ITS solutions.

The paper introduces NPS transportation issues and concerns; provides a brief overview of relevant ITS technologies and applications; discusses the state of ITS within national parks; identifies the potential benefits of ITS technologies; and lays the groundwork for discussion regarding ITS strategies for the NPS by posing several questions to be addressed during the workshop.

II. Background

The 1998 Transportation Equity Act for the 21st Century (TEA-21) is a far-reaching piece of legislation that directs the Secretary of Transportation and the Secretary of Interior "to encourage and promote the development of transportation systems for the betterment of the national parks and other units of the National Park System," and required "a comprehensive study of alternative transportation needs in national parks." Consequently, in 1998, the Alternative Transportation Program (ATP) was established as an integral component of the Federal Lands Highway Program (FLHP). The ATP seeks to coordinate policies, projects, and activities related to planning, partnering, and implementation of alternative transportation systems for accessing and traveling within National Park units. The ATP aims "to use innovative, sustainable and appropriate transportation solutions as a way to preserve and protect natural, historical, and cultural resources while providing for safe and enjoyable access to the National Park System."

A key ATP objective is to seek solutions to transportation problems that alleviate the need for additional roadway facilities. ITS – the application of advanced information and communications technologies to improve transportation safety and efficiency – hold the promise of offering alternatives to road building as a solution to meeting growing travel demands. Thus, ITS represents a means by which the NPS can devise sustainable solutions

to current and future transportation challenges, to ensure natural resources will remain unimpaired for the enjoyment of future generations.

To this end, the "National Workshop to Develop an Intelligent Transportation Systems Program Strategy for the National Park Service," seeks to convene stakeholders from the National Park Service, the U.S. Department of Transportation, state and local agencies, industry and academia, to help lay the groundwork for developing ATP strategies that will promote and facilitate ITS applications appropriate to National Parks.

III. Overview of ITS and NPS Transportation Challenges

Simply put, ITS involves the application of electronic computer, navigation, information, and communication technologies to improve transportation system management and operations, and/or improve the travel experience (one part of the overall visitor experience in the case of national parks). The underlying concepts are not necessarily new. Highway Advisory Radio (HAR) – the use of short distance, AM radio transmitters along roadways to provide information on directions, travel conditions and hours of operation – has been a fixture at some national parks for decades. What is new, however, is the expanding capabilities and falling costs of electronic technologies that are providing opportunities to monitor and respond to traffic, travel, weather, and emergency conditions almost instantly – giving facility managers and users unprecedented access to data needed for making informed decisions. In addition, payment technologies allow fees, fares, and tolls to be collected electronically as a traveler convenience.

Information technologies increasingly are being incorporated in transportation infrastructure and vehicles to improve transportation system performance and to provide new or improved services. As transportation systems are modernized or newly planned, ITS features should be considered and incorporated as appropriate to address the needs of an area. However, it is imperative that the decision to use ITS be tied to clear management and operational goals and objectives if success is to be assured. This requires that transportation challenges be well understood so that ITS can be applied as part of a comprehensive solution.

National parks face a number of transportation challenges as visitation increases. Although each challenge reflects the distinctive urban, rural, or parkway of its setting, there are some general similarities.

- *Overcrowding.* Especially at some of the more popular destinations, and in parks located within crowded urban settings, accessibility has become a major problem that impacts the visitor experience and can negatively affect visitation levels.

- *Congestion.* Seasonal traffic jams in the heavily visited parks limits the ability of visitors to access park attractions and can result in a frustrating "parking lot" experience rather than a relaxing "parkway" experience. In peak traffic periods, parks that collect entrance fees often are faced with long queues, as visitors wait in line to pay fees to an attendant. Additionally, air quality suffers as a result of increased vehicle emissions due to traffic congestion.

- *Parking problems.* As visitation increases, parking lots fill – prompting some visitors to create impromptu parking areas that can result in damage to sensitive natural resources unless park staff are diverted from their other duties to direct traffic. And, its not just automobile parking that creates problems. Tour and school buses parking is a significant challenge at several parks as well.

- *Lack of traveler information.* Timely and accurate information often isn't available to travelers to allow them to make informed decisions based on park traffic and road conditions, weather-related delays, facility closures, parking and/or lodging shortages, and available alternative transportation options.

- *Public Safety.* The ability to locate and assess incidents and provide timely emergency response services can spell the difference between life and death – particularly in remote locations. From a transportation perspective, public safety needs exist in parks that have the potential for vehicle (car, bus, train, ferry, aircraft and bicycle) and pedestrian accidents.

Although national parks exist, in part, for the enjoyment of visitors, addressing transportation needs solely by providing more road space and parking at the expense of historical, cultural, or natural resources generally is not an option. As an integral part of park road and alternative transportation system improvements, ITS can be used effectively to address many of the above challenges associated with increasing park visitation. Several ITS applications that may be useful in national parks are outlined below along with representative benefits.[1] It is anticipated that other ITS applications will be revealed as part of workshop discussions based on expressed NPS transportation issues and challenges.

- *Advanced Traveler Information Systems (ATIS).* Using various monitoring and reporting techniques, travelers can be kept informed of traffic conditions, road closures, weather conditions, and special events, and can be automatically directed to less crowded entrances, attractions, and parking areas – thereby balancing visitation with the carrying capacity of the park. Likewise, information on how use alternative transportation services that can provide access to or within a park can be provided via Internet, phone, HAR, and handheld wireless devices. ATIS has been estimated to reduce freeway travel delays by over 5% due to "informed travelers" choosing alternative modes, routes, destinations, or departure times. Estimates also indicate that traveler information has reduced Carbon Monoxide (CO) emissions in Boston by 33% and Nitrogen Oxides (NOx) by 1.5%.

- *Advanced Public Transportation Systems (APTS).* Parks with Visitor Transportation Systems (VTS) can keep travelers informed of available services, and can better and more flexibly coordinate such services, by, for instance, making use of Global Positioning Systems (GPS), which enable a vehicle's precise location to be monitored and a predicted time of arrival communicated to visitors waiting at a VTS stop or

[1] Source: http://www.benefitscost.its.dot.gov

station. In addition, on-board or hand held information technologies can enable new opportunities for multi-lingual, multi-media interpretive services for park visitors while en-route – in addition to helping them not miss their destination. APTS also sensors and vehicle control systems that can help vehicle operators: see through fog and darkness; detect animals, people and obstacles at a distance on the road ahead; safely merge, change lanes, pass, and backup; as well as precisely park and dock vehicles to maximize space utilization and/or ease passenger boarding and alighting. And APTS includes systems to allow transit vehicles to request extended "green time" from cooperative traffic signals so that they do not fall too far behind schedule due to congestion. APTS has been demonstrated to promote transit usage, decrease passenger complaints by 26%, and allow service to be provided with a 4% to 9% smaller fleet size due to more efficient vehicle utilization.

- *Electronic payment systems.* Automating fee payments using toll-tag or smart-card technology would greatly reduce queuing problems and provide for more flexible and more convenient payment methods. To the extent electronic payment can be integrated across all available visitor transportation services, visitors will have the convenience of a seamless payment mechanism. In addition, such devices can provide information about park usage and visitation patterns whether a fee is collected or not. In Europe, user acceptance of coordinated smart cards to pay for transit and city services is above 70% in some areas. Electronic payment systems allow toll and transit authorities to lower the cost of transactions by up to 90%. New Jersey Transit estimates its savings at $2.7 million per year. Users benefit from shorter queues as 2 to 3 times the number of vehicles can be processed per hour by electronic rather than manual processing. In addition, with electronic toll collection levels at 40%, the Florida Turnpike Authority estimates air quality improvements at its toll booths as follows: CO 7.3%, Hydrocarbons (HC) 7.2%, and NOx 34%.

- *Incident Management Systems*. Incidents mostly are thought of in connection with traffic accidents, but an incident is anything that disrupts the safe and efficient operation of a transportation system: a vehicle breakdown, debris on a roadway, a medical emergency on-board a vehicle, a terrorist threat, minor flooding or natural disasters, and in the case of some national parks – unusual animals near the roadside. Early detection and assessment of incidents can allow timely and measured responses to restore safe and efficient transportation operations – thus minimizing the adverse impact of incidents on the visitor experience and/or park resources. And, video incident detection and monitoring technology also provides a documentary record that can help protect against fraudulent personal injury or property damage claims. Estimated benefits from roadway incident management systems include: a 41% freeway accident rate reduction; 2,600 gallons of fuel saved per major freeway incident and 95,000 to 2,000,000 hours of delay reduction per year on major roadways – with associated economic benefits of one to 45 million dollars annually. Potential incident management benefits in national park applications have yet to be determined, but may be significant even given lower traffic volumes.

- *Transportation Data Collection.* A wide variety of pavement, bridge, and traffic sensors, motor vehicle classification technologies, and automated passenger counting systems are available to help agencies collect and optimize transportation operations and investment decisions. The benefits of ITS data collection and archives have yet to be assessed due to the newness of such concepts, however, expectations are that the cost of existing data collecting efforts can be reduced and that more and better data sources will become affordable to serve various transportation system planning and operations management needs.

- *Enforcement.* Automated traffic law enforcement using ITS – especially with respect to red light running and speeding, and parking as well – is gaining favor with a number of jurisdictions as a proactive safety measure. Such applications are not without controversy, however, due to public concern about the possible loss of personal privacy which often give rise to public relations challenges due to the characterization of such systems as "Robo-Cop" or "Big Brother" technologies by privacy advocates. Automated enforcement has reduced red-light violations by 20% – 75% at various locations.

Increasingly, ITS offers solutions that, in most cases, can be purchased from established vendors, tailored for particular needs and uses, and installed and operated at relatively low cost. The range of possibilities is only limited by the imagination – hence the importance of having clear ITS goals, objectives, and a detailed concept of operations tailored to the individual park unit and prospective partners in the surrounding area. Moreover, ITS applications for national parks need to be implemented in a context sensitive manner to ensure that installations are consistent with natural surroundings and park characteristics.

IV. State of ITS in the National Parks

ITS is not entirely new or foreign to the National Park Service. Several parks have experience in planning and deploying ITS technologies and more are beginning to or expected to do so. As previously noted, the use of Highway Advisory Radio (HAR) to provide visitor information is well established in some park units. However, TEA-21 made ITS eligible for funding within U.S. DOT highway and transit programs – including the Federal Lands Highway Program (FLHP).

Several of the large western parks were among the first to use ITS. It just so happens that Yosemite NP, Yellowstone NP, and Grand Canyon NP each are bordered by states that are leaders in embracing ITS concepts. In addition, ITS awareness in these areas was stimulated by Western Transportation Institute presentations and workshops on rural ITS applications.

- *Yosemite National Park (California)*

  In the mid-1990s Yosemite worked with Caltrans (California DOT) and others on the Yosemite Area Traveler Information System Field Operational Test (YATI). It was designed "to disseminate traveler information, including weather, road conditions, alternative transportation options, destination options, and traveler and other services by

way of Changeable Message Signs, the Highway Advisory Radio System, a Traveler Advisory Telephone System, kiosks and the Internet."[2] More recently, the Western Transportation Institute has been involved in an evaluation of ITS applications for national parks in California, including a vehicle-management system at Yosemite National Park. Such a system would incorporate ITS technologies enabling traffic management, visitor information systems, an electronic fee-payment system keyed to various pricing schemes and integrated with regional transportation fee-collection systems, and monitoring systems designed to gauge effectiveness. A related effort involving ITS technologies is the replacement of Yosemite's traffic information system, which calls for the installation of new traffic counters, a traffic information computer system, and the necessary communications linkages. These Yosemite projects build upon an existing relationship with Caltrans and will be integrated with existing systems.

- *Yellowstone National Park (Montana)*

  Yellowstone NP has been working with the Western Transportation Institute and Montana DOT on several initiatives as part of the Greater Yellowstone Rural Intelligent Transportation Systems (GYRITS) corridor project. First initiated in 1997 to showcase field operational demonstrations of advanced transportation technologies, GYRITS encompasses touch-screen kiosks, dynamic-warning variable message signs, incident-management planning, an automated vehicle-identification system, and a regional traveler and weather information project (GYRTWIS). Other stakeholders are also involved in this large-scale, multi-jurisdiction effort, which aims to develop an integrated system covering not only Yellowstone National Park itself but the surrounding area as well.

- *Grand Canyon National Park (Arizona)*

  Grand Canyon NP worked with Arizona DOT, the Arizona Department of Public, the National Weather Service, and other stakeholders in undertaking the first U.S. DOT sponsored ITS "Early Deployment Plan" for a rural area. Initiated in 1996, the project identified ITS needs along a broad corridor in Northern Arizona that includes nearly 20 major tourist attractions, including the Grand Canyon and the Petrified Forest National Parks. This seminal effort was incorporated in a U.S. DOT ITS Joint Program Office case study[3] of ITS planning in rural areas. As a result of this effort, Grand Canyon NP roadways have been incorporated in the Arizona DOT Highway Closure and Restriction System[4] (HCRS) to provide seamless information on travel conditions to park visitors that total over five million annually. Currently the park is planning the Grand Canyon Transit System as an alternative transportation system. The proposed system includes integrated ITS traveler-information technology to provide visitors with a wealth of information about the new system and their transportation options, ensuring that transit

[2] Caltrans – Advanced Transportation Systems Program Plan: 1996 Update
[3] Statewide ITS Architecture – A Case Study: Arizona's Rural Statewide ITS Architecture, U.S. DOT Volpe Center, September 1999. See http://www.its.dot.gov - ITS Electronic Document Library No. 9647.
[4] http://www.azfms.com/HCRS/hcrs.html

services are effectively and efficiently utilized. Arizona DOT is a partner in this effort, which will link to the existing HCRS.

A turning point for ITS in the National Parks was reached in 1999. The "National Parks Transportation Alternatives and Advanced Technology for the 21st Century" conference was held at Big Sky, Montana. Prospective park applications of ITS technologies were discussed. The Federal Highway Administration and the Federal Transit Administration commissioned a "Study of Transit Needs in National Parks and Related Public Lands," in response to Section 3039 of TEA-21. Included within the "3039" study is an initial attempt to identify ITS needs within the National Park System. And, U.S. DOT and the Department of the Interior (DOI) undertook a joint Field Operational Test (FOT) at Acadia in order to evaluate the effectiveness of ITS applications deployed in a national park.

In this attempt to characterize the "State of ITS", Volpe Center staff reviewed the Section 3039 report findings and attempted to identify prospective ITS applications within the FY2000-2003 Alternative Transportation Program proposals. Each contain references to ITS and demonstrate that the National Park Service is beginning to pursue ITS as a viable, feasible solution to some of its transportation challenges. So far, park units that have displayed interest in ITS have mostly concentrated on: data collection and traffic monitoring, electronic access control and fee payment, transit fleet management, and traveler-information systems. These are perhaps the areas in which the greatest initial benefits can be realized through the application of ITS technologies.

The State of ITS in National Parks is more completely depicted by the following list of ITS programs within the National Park Service that are either underway or have been proposed. These are arrayed in alphabetical order to ease locating ITS activities in a specific park.

- *Acadia National Park (Maine)*

  The most comprehensive ITS activities within the National Park Service have taken place at Acadia. The Acadia FOT has centered on the very successful Island Explorer bus transit system. The "Island Explorer Operational Enhancement System" incorporates a number of ITS technologies: two-way voice communications, automatic vehicle location, real-time arrival signs, automated annunciation, and automated passenger counting. Also, a traveler information system, including web-based and interactive voice-response technologies, is slated for evaluation. A "National Park Dispatch Enhancement System" that would include park ranger geo-location systems and monitoring of traffic and parking conditions near the park's entrance and parking lots was proposed but subsequently deferred do to funding limitations. The FOT is being carried out within the framework of the National ITS Architecture, in order to promote consistency with other local, regional and national ITS activities.

- *Arches National Park (Utah)*

  Arches NP intends to address transportation-related air quality issues through a comprehensive transportation planning effort for alternative transportation systems,

including ITS in connection with other demand management and congestion management techniques (such as integrating the park's existing transportation network with bicycle and pedestrian paths). Indeed, ITS can be one means by which conventional transportation-planning techniques are either accomplished or made more efficient; congestion management, for example, is an area in which ITS technologies can be of benefit.

- *Boston National Historical Park and surrounding metropolitan-area NPS units*

  To facilitate the use of public transportation to access NPS and partner sites in and around the Boston metropolitan area, an "improved information-services" project is outlined that calls for ITS technology and signage to transmit essential public-transportation information to park visitors. Coordination with partners and stakeholders is also part of the plan. This project shows how ITS can fit well with earlier planning efforts; in the Boston case, an earlier transportation project study called for improved transit information services, and the parks now have a specific means by which those services are to be provided. Because many partners will be involved, there is great opportunity for extensive local and regional involvement.

- *Bryce Canyon National Park (Utah)*

  Bryce Canyon NP is pursing the installation of "Fast Pass" electronic access-control system at two shuttle entrance / stop locations to enable the creation of dedicated travel lanes within the park for shuttles and tour buses. And, the park is working to install a changeable message sign outside the park to inform visitors of park road and parking area congestion. These measures, implemented as a complement to its shuttle bus system, are expected to help reduce congestion and increase visitor satisfaction. The Utah DOT is partnering with the park to help it acquire message signs that are compatible with those on the state highway system.

- *Cape Cod National Seashore (Massachusetts)*

  As part of a cooperative regional alternative transportation planning effort, Cape Cod NS is considering transit projects that include ITS technologies. Both on-board and wayside systems are being considered to enable efficient operations. Due to the cooperative regional approach, visitors and residents alike will be able to access this information and use it to plan their travel. On days when it is raining in one area of the Cape and not in others, visitors will be able to avoid wasted trips by making alternate plans.

- *Cumberland Gap National Historical Park (Tennessee, Kentucky)*

  As part of the Cumberland Gap Tunnel Project, the National Park Service and the Federal Highway Administration have included ITS elements to help mitigate construction effects. The project makes use of an integrated tunnel control system, including traffic surveillance and control features. Variable message signs will allow the tunnel operator to communicate with motorists, and AM and FM radio signals can also be overridden to

broadcast priority messages. The control center is operated under a contract administered by a joint commission of the Tennessee DOT and the Kentucky DOT.

- *Gateway National Recreation Area (New York, New Jersey)*

  At its Sandy Hook unit in New Jersey, Gateway NRA is considering the installation of variable-message signs in order to improve its parking management. This is part of a larger concept that would include variable-message signs, parking lot monitoring, and perhaps a comprehensive parking system management study. Importantly, the park is cooperating with state and regional transportation management agencies so that traffic and travel conditions at and in the vicinity of the park can be communicated throughout the greater NY/NJ region.

- *Gettysburg National Military Park (Pennsylvania)*

  The park plans to construct a new visitor center about half a mile from the current visitor center. Congestion is anticipated to grow due to increasing visitation both in Gettysburg NMP and the surrounding community. This led the park to propose the creation of a "Shuttle / ITS" system to address congestion problems in both areas. In a partnership between Gettysburg National Military Park, the Borough of Gettysburg, and the Pennsylvania DOT, the plan would implement transit ITS technologies, such as traveler information systems, on-board annunciators, and fleet-management systems. The Shuttle / ITS system, in fact, is intended not merely to be of benefit to the park unit itself but to the surrounding Borough of Gettysburg as well.

- *Glacier National Park (Montana)*

  As part of its long-range transportation planning process, Glacier NP, along with neighboring partners and gateway communities, will consider ITS applications, including snowplow tracking, maintenance fleet management, transit fleet management, and vehicle tracking for both the maintenance and transit fleets between gateway communities and the park itself. This approach will build on the cooperative planning processes Glacier has already established with many surrounding jurisdictions.

- *Golden Gate National Recreation Area (California)*

  Presently in the pre-conceptual stage, Golden Gate NRA is considering the possible use of visitor and vehicle counting systems in order to better manage access and congestion.

- *Great Smoky Mountains National Park (North Carolina, Tennessee)*

  Initially, Great Smoky Mountains NP had considered ITS installations to mitigate anticipated congestion as a result of construction work scheduled to take place in the vicinity of the park. Although that initial effort fell through, the park now is developing a longer-term strategic transportation plan that includes ITS elements. In cooperation with the Southern Appalachian Mountain Initiative, the park conducted and wishes to build

upon a transportation-technology feasibility study for the Cades Cove area, one of the most visited areas in the National Park System (over 2 million per year). By conducting ITS strategic planning in connection with local partners, the park intends to be well positioned to execute ITS projects in cooperation with surrounding agencies.

- *Rocky Mountain National Park (Colorado)*

  Rocky Mountain National Park plans to implement a Vehicle Access Control System at its Beaver Meadows entrance station. The access control system is intended to allow holders of Park Pass cards and authorized National Park and commercial / transit service vehicles to by-pass the gates and expedite their entrance into the Park. The gate control system is a dual mode system that can be activated by a card reader (for card holders) and transponder / proximity reader (for equipped authorized vehicles). The system would read both existing National Parks Passes in circulation and new Rocky Mountain National Park specific passes. The National Parks Pass was designed with a magnetic strip in anticipation of this and other applications. Successful implementation will demonstrate the capabilities of this technology for this purpose, and its potential for such application throughout the NPS. Over 400,000 National Park Pass cards are in circulation, and Rocky Mountain NP anticipates selling 45,000 Rocky Mountain park specific cards per year.

- *Santa Monica Mountains National Recreation Area (California)*

  Presently in the pre-conceptual phase, Santa Monica is considering the use of parking monitoring technology and variable-message signs to notify drivers of parking availability. When a parking lot fills, the monitoring instrumentation can link in real time to variable-message signs, providing motorists with information such as the location of available parking. One consideration at Santa Monica is its unique geography: motorists must receive relevant information before the 'commitment point' at which they must decide to proceed to the park or not. That point on the road, however, is located outside of the Park Service's jurisdiction, and the park will have to resolve this institutional issue before proceeding with the ITS installation.

- *Sequoia and Kings Canyon National Parks (California)*

  As part of implementing its "Giant Forest" plan, Sequoia and Kings Canyon national parks have called for the development of "appropriate levels of ITS" in connection with roll-out of a shuttle bus transit system. By including ITS at the beginning of the planning process, the parks hope to make the best possible use of whatever technologies are available and may be appropriate under the variety of circumstances the planning process will consider.

- *Shenandoah National Park (Virginia)*

  Shenandoah NP intends to "provide seasonal alternative transportation service between the park and nearby locations outside the park, a park concession employee shuttle, and

refinement of a plan for use of ITS technologies to provide enhanced visitor information and to encourage use of the implemented ATS alternatives." Improving communications at Shenandoah NP will improve visitor safety and welfare by providing better pre-trip planning information (and will save money as employees will not need to respond to so many telephone requests for assistance). Also, given Shenandoah's linear orientation, the park intends to use its ITS planning process as one means of improving cooperation with its gateway communities and other area partners.

- *Zion National Park (Utah)*

  Zion NP has proposed a comprehensive ITS program, including variable-message signs operated in conjunction with adjacent communities to provide integrated traffic information to motorists and an electronic access-control system, similar to Bryce Canyon NP, that would allow only shuttle buses and other authorized vehicles into the Zion canyon at certain times.

National Parks and ITS by the Numbers

Notably, there is evidence of ITS activity in every National Park Service Region. Whereas the number and nature of ITS projects varies from park to park, some commonalities exist. Of the 19 ITS initiatives outlined above:

- 13 include traveler-information system elements
- 9 include data-collection, monitoring, or traffic-management elements
- 7 include APTS / transit fleet management elements
- 5 are components of a longer-term strategic transportation plan
- 4 include electronic access-control or fee-payment elements

There are, of course, about 400 park units under the jurisdiction of the National Park Service; the majority of which have not displayed an awareness of or current interest in ITS – and this may be entirely appropriate. But the trends apparent from current ITS projects and proposals do speak to an increasing realization that ITS holds potential. Both urban and rural parks have begun considering ITS deployments and including ITS in their transportation planning processes; traveler information systems, data collection, and traffic-management seem to be the most popular initial areas of interest. Although not addressed in this paper, Park Police in the National Capitol Region are using ITS in a prototype Advanced Law Enforcement and Response Technology vehicle that enables voice communications and data sharing with other law enforcement authorities in the District of Columbia during joint operations. In addition, this prototype vehicle has electronic accident data collection systems that allow reports to be completed and databases to be updated almost immediately.

Important ITS issues are beginning to surface, however. As noted earlier, context-sensitive design is a concern: how, for instance, can parks proceed with ITS deployment of cameras, monitoring devices, access-control systems, and communications equipment while making sure that the design is as unobtrusive as possible? Institutional issues and funding concerns are also moving further to the foreground as these considerations become more important.

And, there is a sense that an NPS-wide approach may be needed with respect to some ITS applications to meet visitor expectations of consistency among ITS services within parks. These are areas in which overall NPS-wide ITS strategies might be most helpful; and there are others, no doubt that will merit discussion during the National Workshop to Develop an Intelligent Transportation Systems Program Strategy for the National Park Service.

V. Targeted Questions for Strategy Development

The June 2001 workshop will address many of the issues presented in this section in more detail, but it is worth outlining some of the major questions that must be answered if a useful strategy is to be developed. These questions are presented within the four topic areas planned for workshop discussion.

1. Challenges to ITS deployment.

- What transportation planning and implementation challenges need to be addressed in order to allow national parks to reap the benefits of ITS? A wide range of concerns must be taken into account, from how to justify and communicate ITS benefits, to political and institutional considerations, to context-sensitive design features, to the lack of extensive power and communications infrastructure in remote areas, to a bewildering array of technology choices, to the need for community outreach and support.
- Funding is a primary concern as well, especially for life-cycle ITS operating costs and technology refreshment needs. Most ITS projects to date have involved multiple funding sources or partnership arrangements. What funding arrangements or partnering assistance is needed to help facilitate ITS planning and deployment?
- What level of ITS integration should the NPS strive to obtain, both internally and with external partners? How will TEA-21 statutory requirements for National ITS Architecture and Standards conformity when using Federal highway and mass transit funds, including FLHP / ATP funding. Will additional ITS architecture and standards specifically tailored to NPS applications required?
- To what extent does ITS need to incorporate Federal Acquisition Regulation Section 508 requirements for making Federal agency electronic and information technology accessible to people with disabilities? Are NPS guidelines needed?

2. ITS benefits.

- Given that ITS is emerging as a solution to some transportation issues and concerns in national parks, what are the leading transportation challenges in national parks that can benefit from ITS solutions?
- What range and extent of ITS benefits should the National Park Service expect from ITS, or from ITS applications in individual parks?
- What expectations are reasonable, and how is performance to be measured and compared to other transportation improvement alternatives?

- To what extent can ITS benefit ongoing efforts to meet TEA-21 requirements for safety and congestion management systems?

3. ATP program strategies.

- What program strategies are appropriate to enable moving forward with ITS within the Alternative Transportation Program?
- What are the best means of working with partner organizations, such as concessionaires, local and state DOTs, advocacy groups, and gateway communities?
- What strategies and/or activities should the NPS Alternative Transportation Program undertake at the national level?
- The Acadia project is a field operational test; other projects seek to apply proven approaches; still other projects are part of larger, regional initiatives. How should a national strategy accommodate and prioritize these various purposes and approaches?

4. ITS strategy implementation.

- How should responsibilities be divided and who will play what roles in the implementation of an ITS strategy for the NPS?
- One longstanding concern within the National Park Service is the role of headquarters versus that of individual park units that operate with considerable autonomy; will a nationwide strategy change how and why decisions affecting individual parks are made? How should NPS headquarters and individual park unit interests be allocated in implementing a strategy?
- What roles and responsibilities should the NPS look to the U.S. DOT and others to perform or provide?
- What resources will be required, in terms of time, money, personnel, and other resources? Will training be a concern?
- What interagency partnerships would be useful, and how may these arrangements change?

During the workshop, it is expected that participants will discuss these and related questions extensively, and that the National Park Service will be able to continue to work cooperatively to craft an effective ITS program strategy once workshop proceedings have been published.

#

Sources

"Study of Transit Needs in National Parks and Related Public Lands," National Park Service and Cambridge Systematics, 2000.

"Acadia National Park ITS Field Operational Test Draft System Concept Report," SAIC Rural Support Deam, January 2001.

"ITS Field Operational Test," presentation, James Pol (ITS JPO) and Frank Corrado (EFLHD), December 2000.

"Advanced Public Transportation Systems: State of the Art Update 2000," Volpe Center, December 2000.

"Inventory and Assessment of NPS Visitor Transportation Systems," Parsons Brinckerhoff, August 6, 1999.

"Rural Automated Highway Systems Case Study for Greater Yellowstone Rural ITS Corridor – Final Report," Western Transportation Institute, January 1998.

"National Parks Transportation Alternatives and Advanced Technology for the 21st Century," conference proceedings, Western Transportation Institute, June 1999.

"NPS FLHP Roads, Bridges, and ATS," undated.